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TITLE

An Adhesive Agent and Use of Such Adhesive Agent

BACKGROUND OF THE INVENTION

5 **1. Field of the Invention**

The invention relates to a pressure sensitive adhesive composition suitable for application to human or animal skin, to a method for preparing such adhesive compositions and the use of such adhesive composition for the preparation of a wound dressing or a adhesive wafer for an ostomy appliance or the use of the adhesive composition for securing of and sealing around ostomy bandages, for securing wound dressings, for securing of devices for collecting urine, wound-drainage bandages, orthoses and prostheses and for protection skin areas and parts of the body against pressure, impacts and friction and to wound dressings or ostomy appliances comprising such adhesive composition.

15 In particular, the invention relates to hydrophilic pressure sensitive adhesives or hydrogel adhesive having an optimised degree of adhesion to moist and wet skin and mucous membranes and furthermore having an optimised cohesiveness during hydration.

20 **2. Description of the Related Art**

Pressure sensitive adhesives have been used for many years for fixation of medical devices on human skin, for wound treatment, for drug delivery and for a verity of medical, cosmetic and industrial uses.

25 Various skin adhesive agents are used today for the above-mentioned purposes.

US Patent No. 6,576,712 Feldstein et al. discloses a hydrophilic pressure sensitive adhesive composition comprising a hydrophilic polymer and a complementary short-chain plasticizing agent such as polyethylene glycol wherein the hydrophilic polymer and plasticizing agent are capable of hydrogen bonding or electrostatic bonding to each other.

A commonly used embodiment of pressure sensitive adhesive compositions for application to skin comprises an adhesive elastomeric matrix comprising water-absorbing, swelling particles, the so-called hydrocolloids, dispersed therein.

- 5 Published International Patent Application No. WO 98/48858 (Chen) discloses a pressure sensitive adhesive composition suitable for application to human or animal skin comprising a conjugated diene polymer, a polyvinyl pyrrolidone polymer or a polyvinyl pyrrolidone vinylacetate copolymer, optionally one or more hydrocolloids and optionally a physically cross-linked elastomer selected from
- 10 block-copolymers comprising styrene and one or more butadienes improves the rate of absorption of water and improves the integrity of the adhesive composition as well as the tack of an adhesive agent on wet skin

SUMMARY OF THE INVENTION

- 15 The present invention relates to a pressure sensitive adhesive composition comprising one or more hydrogel-forming hydrophilic homopolymers or heteropolymers.

Detailed Description of the Present Invention

- 20 The present invention relates to a pressure sensitive adhesive composition comprising one or more hydrogel-forming hydrophilic homopolymers or heteropolymers and one or more amphiphilic block-copolymers comprising hydrophobic polymer blocks being incompatible and hydrophilic polymer blocks being compatible with the hydrogel-forming hydrophilic homopolymer or heteropolymer matrix. The hydrogel-forming hydrophilic homopolymers or heteropolymers are suitable present in an amount from 10 to 80% by weight of the total composition.
- 25

- The adhesive compositions are useful, for example, in transdermal drug delivery systems and other medical, pharmaceutical and cosmetic products that adhere to
- 30 the skin or other body surface. The invention has utility in a number of fields, including transdermal drug delivery, iontophoretic systems, biomedical electrode fabrication, wound healing, and skin care and cosmetic products.

The advantages obtained by the invention are improved adhesion to wet or moist skin as well as mucosa, which means that these new adhesive formulations have increased wet tack properties compared to ordinary hydrocolloid adhesive or acrylic adhesive.

5

The adhesive compositions may be used for securing ostomy appliances to the wet skin and for sealing around an ostomy, for securing wound dressings or wound drainage bandages to the skin, especially for securing devices for collecting urine to the skin, or for securing orthoses or prostheses to the skin. The
10 ostomy appliances or wound dressings may be any such product known per se and may be prepared in a manner analogous to the preparation of similar products using conventional adhesive compositions.

15

The hydrophilic homopolymer or heteropolymer is suitably a poly-vinylpyrrolidone polymer or copolymer. The hydrophilic homopolymer or heteropolymer provides for a very effective wet tack on human skin rendering it suitable for application on humid skin or exuding wounds, or on moist skin around a stoma.

20

For some applications it is preferred that the adhesive composition of the invention comprises a plasticizer for the hydrophilic homopolymer or heteropolymer. This is especially the case when the hydrophilic homopolymer or heteropolymer is a polymer of a relatively high degree of polymerisation in order to ensure optimum elastic and plastic moduli for the intended use as soft skin or mucosa adhesives.

25

When using a plasticizer in the adhesive compositions of the invention, it is preferably selected from the group consisting of polyethylene glycols, and water. The plasticizer is suitably present in an amount of from 20 to 50% by weight of the total composition

30

It is a prerequisite that the amphiphilic polymer contains hydrophobic blocks incompatible with the hydrogel-forming hydrophilic homopolymers or heteropoly-

mers. The amphiphilic polymer is suitably present in an amount of from 10 to 50% by weight of the total composition.

5 The amphiphilic copolymer being partly compatible with the hydrogel-forming hydrophilic homopolymers or heteropolymers and partly incompatible with the same will provide a degree of physical cross-linking of the hydrogel-forming hydrophilic homopolymers or heteropolymers. When using diblock amphiphilic copolymers the physical association of hydrophobic end blocks in separate domains will provide a considerable increase and control of the viscosity of the composition and
10 when using tri-block amphiphilic copolymers the physical cross-linking will provide a pronounced cohesion effectively stabilising the hydrogel and enabling a removal thereof essentially without leaving remains on the skin.

15 Amphiphilic block polymers consist of a non-polar polymeric chain coupled to a polar polymeric chain. More in particular the polar chain end of the polymer must be water-soluble or water swellable to at least a content of 300% water if taken alone. The non-polar chain preferably does not take up more than 10% of water when submersed in water.

20 The polymers are made from two or more monomers each of which are grouped in blocks. The polymers may for instance be a diblock from monomers A and B having a structure AAAAABBBBBB or a triblock having a linear structure like AAAABBBBBBAAAA or alternatively in the form of a multi block or three or multi arm star-shaped copolymer structure.

25 The incorporation of amphiphilic block copolymers having long hydrophobic end blocks as di, tri, multi or star block copolymers improves the cohesion dramatically compared to the incorporation of conventionally used associative thickeners. Due to the physical cross-linking the amphiphilic block copolymers maintain the
30 high cohesion in the adhesive during hydration and water absorption.

The hydrophobic block of the block-copolymer will constitute separate physically cross-linked domains being incompatible with the continuous hydrophilic phase.

5 The hydrophilic blocks being compatible with the matrix of a given adhesive may be any type of polymer or oligomer resembling the chemical structure of the matrix of the adhesive. Thus, in a Styrene-acrylic acid or styrene-vinylpyrrolidone block copolymer adhesive the hydrophobic blocks should be incompatible with the domains formed by the acrylic acid or the polyvinylpyrrolidone. The hydrophobic polystyrene blocks form discrete domains, which act as physically cross-
10 links. The polyacrylic acid or polyvinylpyrrolidone domains in such adhesives typically contain a plasticizer and may furthermore, if desired, contain tackifying resins and will generally be softer and yielding as opposed to the more crystal-like hydrophobic polystyrene domains.

15 Due to the formation of a physically cross-linked polymer system formed by a phase separation of the hydrophobic blocks comprising styrene or other hydrophobic monomers attached to blocks of one or more hydrophilic monomers, which are capable of forming hydrogen bonding or electrostatic bonding of the hydrogel-forming hydrophilic homopolymers or heteropolymers to the matrix
20 forming polymers the risk of exudation separation is reduced or even eliminated.

Thus, in one embodiment of the invention in which the hydrogel-forming hydrophilic homopolymer or heteropolymer is a polyvinylpyrrolidone, the hydrophilic block of the amphiphilic polymer must be compatible with polypolyvinylpyrrolidone or optionally with polyvinylpyrrolidone compounded with a plasticizer.
25

In another embodiment of the invention in which the hydrogel-forming hydrophilic homopolymer or heteropolymer is a carboxylic acid or acrylic acid polymer, the hydrophilic block of the amphiphilic polymer must be compatible with the hydrogel
30 phase comprising the polycarboxylic or polyacrylic acid polymer.

5 The hydrophobic part of the amphiphilic block copolymer may suitably be polystyrene, a poly alpha-olefin such as polyethylene, polypropylene poly-1-butene or polyisobutylene, a poly acrylate, a polyvinylether, a polyacetate, a polysiloxane, a hydrophobic polyester or similar polymers moieties conventionally used in pressure sensitive adhesive formulations.

10 The hydrophilic part of the amphiphilic block copolymer (B block) may suitably be any type of polymer that will be able to absorb significant amounts of water. If taken alone, the hydrophilic block is water-soluble or at least highly water absorbing. Suitable polymers for use in amphiphilic polymers for use in accordance with the present invention are PEG (polyethylene glycol), PVP (polyvinyl pyrrolidone), polyacrylic acid, salts of polyacrylic acid, salts of polymers of composed with acids such as maleic acid, polyvinyl alcohol, hydrophilic polyurethanes, or carbohydrates or gelatins. The hydrophilic block preferably has a minimum molecular weight of about 500 in order to be able to form separate hydrophilic domains in the adhesive composition. Preferably the molecular weight is higher than 1000 in case of end blocks and 5000 in case of midblocks.

20 For use in accordance with the present invention it is suitable that the amphiphilic polymer contains styrene blocks.

In a suitable alternative embodiment of the invention the amphiphilic polymer contains acrylic hydrophobic blocks

25 In a further embodiment of the invention the amphiphilic polymer contains hydrophobic blocks from a vinylic unsaturated aliphatic hydrocarbon comprising from 1 to 6 carbon atoms.

30 Preferred and commercially readily available vinylic unsaturated hydrocarbons comprise 4 carbon atoms, polybutylene and polyisobutylene being most preferred.

In yet another preferred embodiment of the present invention the amphiphilic polymer contains an amphiphilic polyurethane copolymer.

Preferred amphiphilic block copolymers will be described more in detail below.

5

Preferred amphiphilic block copolymers to be used in accordance with the present invention are such wherein the A domain is a thermoplastic polymer segment end block of a mono vinyl aromatic homo polymer, preferably one having at least two different molecular weight end blocks in the copolymer (E.g., one of about 1000 to about 50,000 number average molecular weight and the B block of about 1000 to about 500,000 number average molecular weight), where the B domain is the hydrophilic polymer segment or the mid block in case of a triblock copolymer.

10

15 Hydrophilic monomers for use in the A block are monovinyl aromatic monomers which typically contain from about 8 to about 18 carbon atoms such as styrene, alpha-methylstyrene, vinyltoluene, vinylpyridine, ethylstyrene, t-butylstyrene, isopropylstyrene, dimethylstyrene, and other alkylated styrenes, and also suitably in the form of acrylic esters or vinyl esters.

20

Alternatively, the A domain may comprise ethylenically unsaturated monomers chosen from butadiene, chloroprene, (meth)acrylic esters, vinyl esters such as vinyl acetate, vinyl versatate and vinyl propionate; or vinyl halides such as vinyl chloride, and vinyl nitriles.

25

"(Meth)acrylic esters" is used in the present context to designate esters of acrylic acid and of methacrylic acid with optionally halogenated, e.g. chlorinated or fluorinated, C₁-C₁₂ straight or branched alcohols, preferably C₁-C₈, alcohols. Examples of such esters are methyl acrylate, ethyl acrylate, propyl acrylate, n-butyl acrylate, isobutyl acrylate, 2-ethylhexyl acrylate, tert.butyl acrylate, methyl methacrylate, ethyl methacrylate, n-butyl methacrylate and isobutyl methacrylate.

30

Suitable vinyl nitriles are those having from 3 to 12 carbon atoms, such as, in particular, acrylonitrile and methacrylonitrile.

5 It also considered an embodiment of the present invention to replace styrene completely or partly by derivatives thereof such as alpha-methylstyrene or vinyltoluene.

Preferred hydrophilic B block or the hydrophilic polymer segment or mid block in case of a triblock copolymer will be described more in detail below.

10 Further hydrophilic monomers for use in the B block are for example ethylenically unsaturated monocarboxylic and dicarboxylic acids, such as acrylic acid, methacrylic acid, itaconic acid, maleic acid and fumaric acid; and monoalkyl esters of dicarboxylic acids of the type mentioned above with alkanols, preferably

15 alkanols having from 1 to 4 carbon atoms and their N-substituted derivatives; amides of unsaturated carboxylic acids, such as acrylamide, methacrylamide, N-methylolacrylamide or methacrylamide, and N-alkylacrylamides; ethylenic monomers containing a sulphonic acid group and ammonium or alkali metal salts thereof, for example vinylsulphonic acid, vinylbenzenesulphonic acid, alpha-

20 acrylamidomethylpropanesulphonic acid and 2-sulphoethylene methacrylate; amides of vinylamine, especially vinylformamide or vinylacetamide; and unsaturated ethylenic monomers containing a secondary, tertiary or quaternary amino group, or a heterocyclic group containing nitrogen, such as, for example, vinylpyridines, vinylimidazole, aminoalkyl (meth)acrylates and aminoalkyl (meth)acrylamides

25 such as dimethylaminoethyl acrylate or methacrylate, di-tert.butylaminoethyl acrylate or methacrylate and dimethylaminoacrylamide or dimethylaminomethacrylamide. It is also possible to use zwitterionic monomers such as, for example, sulphopropyl(dimethyl)aminopropyl acrylate.

30 Amphiphilic or hydrophilic block copolymers for use in accordance with the present invention may be functionalised for further reactions like graft copolymerisa-

tion, cross-linking or for further polymerisation by inclusion of suitable functional groups.

5 The functional groups may be attached to the ends of the main chains or as side chains. The functional groups may e.g. be unsaturated vinyl groups containing double bonds for further polymerisation. The functional groups may furthermore be photo initiators attached to the block copolymers for UV-polymerisation or for cross-linking. The functional groups may be hydroxyl, primary or secondary amine groups for further reactions with isocyanate for the formation of polyurethane based block copolymers or for cross-linking with isocyanate.

15 The compositions according to the invention may also comprise a cohesion-promoting component such as polyacrylic acid or polycarboxylic acid or acrylic acid copolymers or associative thickeners. Such cohesion promoting component is suitably present in an amount of up to 15% by weight of the total composition.

20 Still further, the compositions according to the invention may also comprise conventionally used extenders or fillers such as polysaccharides like CMC, antioxidants, fibres, salts, clay, buffers, or pigments in an amount up to 30% by weight of the total composition.

25 The adhesive compositions according to the invention may be processed in analogy with conventional methods for preparing thermoplastic adhesives. The preferred method will be by hot melt processes. This includes blending in hot melt mixers like Z-blade mixers, single or double barrel extruders, planet-mixers or equivalent equipment followed by a coating or moulding step to given substrates or release liners. Alternatively the adhesive may be cast form a solution at suitable release liners or backings and added any net or non-woven for reinforcing or improving handling. Still further the adhesive may be foamed, coated or formed into any desired thickness or shape.

Preferred methods of mixing and production of hydrophilic pressure sensitive adhesive are batch vice mixing in high shear Z-blade type of mixers, continuously in single or double screw extruders or by casting from solvent solutions.

5 MATERIALS AND METHODS

PVP types suitable for the present invention are:

| PVP | Molecular weight* | Supplier |
|-----------------------|---------------------|--------------|
| ViviPrint 540 | cross-linked | ISP |
| PVP K-90 | 1.000.000-1.500.000 | ISP and BASF |
| PVP K-30 | 45.000-60.000 | ISP and BASF |
| PVP K-25 | 28.000-34.000 | ISP and BASF |
| PVP K-15 | 7.000-11.000 | ISP and BASF |
| PVP K-12 | 2.000-3.000 | BASF |
| PVP/VA S 630copolymer | | ISP and BASF |

*The molecular weights of the PVP polymers are Mw and is determined by light scattering.

10

Suitable hydrophilic plasticizers for use in the adhesive compositions of the invention are e.g. PEG 300, propylene glycol, dipropylene glycol, glycerol, glycerol diacetate (diacetin), glycerol triacetate (triacetin), triethyl citrate (Citrofol AI), acetyl triethyl citrate (Citrofol AII) and water.

15

Suitable hydrophobic plasticizers for use in the adhesive compositions of the invention are e.g. camphor, castor oil, dibutyl phthalate, dibutyl sebacate, dioctyl adipate (DOA), dioctyl adipate (DOP), acetyl tributyl citrate (Citrofol BII), santicizer 141, Santicizer 148, Santicizer 261, Sebacic acid, and Tributyl citrate (Citrofol BI).

20

Suitable tackifiers are Eastman AQ, polyvinylether, and polyvinylmethylether.

Suitable amphiphilic polyurethanes for the purpose of the present invention are ESTANE T5410 from NOVEON (B.F. Goodrich), Tecophilic HP93A100, Tecogel 500 or 2000 from Thermedics Polymer Products, or HydroMed D640 from CardioTech International Inc.

5

Suitable amphiphilic block copolymers for the purpose of the present invention are a poly(styrene-b-acrylic acid-b-styrene) (product name P3000-SAAS with Mn 2000-65000-2000), poly(methyl methacrylate-b-methacrylic acid-b-methyl methacrylate) (product name P1483-MMAMAAMMA) and poly(styrene-b-ethylene oxide-b-styrene) (product name P2525-SEOS with Mn at 9500-48000-9500) all available from Polymer Source 124 Avro Street, Montreal, Quebec H9P 2X8, Canada.

10

Thickeners are suitably STABILEZE® 06 & QM, GANTREZ®, polymethyl vinyl ether/maleic anhydride copolymers from ISP, Aculyn™ 28 from Rohm and Haas. NEXTON® or Natrosol® Plus CS both hydrophobically modified hydroxyethylcelluloses from HERCULES, or Carbopol homopolymers and copolymers such as Noveon AA1 and Pemulen TR 2 from Noveon.

15

Hydrophilic polymers for use in the adhesive compositions of the present invention may be selected from the group of cellulose derivatives, polysaccharides, polyvinyl-pyrrolidone, polyvinyl alcohol, polyacrylic acid, poly (methyl vinyl ether/maleic anhydride), poly (meth)acrylic acid, polyethyleneglycols (PEG), polyamides, polyacrylic amides, polyethylene glycol (PEG) or copolymers or blends of these.

20
25

Description of the Preferred Embodiments

The invention is now explained more in detail in the below working examples disclosing preparation of preferred embodiments of the invention which are to be considered illustrative of the invention. As all suitable modifications and equivalents may be resorted to, the examples are not to be considered as limiting the scope of the invention set forth in the appended claims.

30

Example 1**Preparation of an adhesive composition according to the invention**

30.5 grams of PVP K-90, 3.5 grams of Pemulen TR2 and 36.0 grams of PEG 400 were mixed as a premix. Initially the premix of the plastizing glycols, the PVP
5 and the cross-linked polyacrylic acid were added and mixed in a Brabender mixer at 60 degrees C for 30 minutes for obtaining a macroscopically homogeneous mixture. The hot adhesive from the mixing chamber was moulded into a sheet of 1 mm thickness between two sheets of silicone paper.

10 Example 2**Preparation of an adhesive composition according to the invention**

3.5 grams of PVP K-90, 17.5 grams of PVP K-25, 3.5 grams of Pemulen TR2 and 28 grams of PEG 400 were mixed as a premix. Initially the premix of the plastizing glycols, the PVP and the cross-linked polyacrylic acid were added
15 and mixed in a Brabender mixer at 150 degrees C for 10 minutes. Then 17.5 grams of the amphiphilic polyurethane (ESTANE T5410) were added slowly in order to ensure complete mixing of the components. After approx. 20 minutes' mixing a macroscopically homogenous mixture was obtained. The hot adhesive from the mixing chamber was moulded into 1 mm thickness between two sheets
20 of silicone paper.

Example 3**Preparation of an adhesive composition according to the invention**

3.5 grams of PVP K-90, 17.5 grams of PVP K-25, 3.5 grams of Pemulen TR2 and
25 28 grams of PEG 400 were mixed as a premix. Initially the premix of the plastizing glycols, the PVP, and the cross-linked polyacrylic acid were added and mixed in a Brabender mixer at 150 degrees C for 10 minutes. Then 17.5 grams of amphiphilic polyurethane (ESTANE T5410) were added slowly in order to ensure complete mixing of the components. After approx. 20 min. mixing a macroscopically homogenous mixture was obtained. The hot adhesive from the mixing
30 chamber was moulded into 1 mm thickness between to sheets of silicone paper.

Examples 4-9

Adhesive compositions of the invention having the compositions in grams of the constituents as described in table 2 were prepared in analogy with the procedure described in example 3.

5

Table 2.

| Constituent | Ex. 4 | Ex. 5 | Ex. 6 | Ex. 7 | Ex. 8 | Ex. 9 |
|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| PVP K-90 | 3.5 | 3.5 | 3.5 | 0 | 0 | 0 |
| ViviPrint 540 | 0 | 0 | 0 | 3.5 | 3.5 | 3.5 |
| PVP K-12 | 17.5 | 0 | 0 | 17.5 | 0 | 0 |
| PVP K-15 | 0 | 17.5 | 0 | 0 | 17.5 | 0 |
| PVP K-30 | 0 | 0 | 17.7 | 0 | 0 | 17.5 |
| Pemulen TR-2 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| T5410 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 |
| PEG 400 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 |
| In total (grams) | 70 | 70 | 70 | 70 | 70 | 70 |

Example 10**Preparation of an adhesive composition according to the invention**

- 10 3.5 grams of PVP K-90, 17.5 grams of PVP K-25, 3.5 grams of Pemulen TR2 and 28 grams of PEG 400 were mixed as a premix. Initially the premix of the plastizicing glycols, the PVP, and the cross-linked polyacrylic acid were added and mixed in a Brabender mixer at 120 degrees C for 10 minutes. Then 17.5 grams of the amphiphilic block copolymer (Poly(styrene-b-acrylic acid-b-styrene))
- 15 were added slowly in order to ensure complete mixing of the components. After approx. 20 min. mixing a macroscopically homogenous mixture was obtained. The hot adhesive from the mixing chamber is moulded into 1 mm thickness between to sheets of silicone paper.

20 Example 11**Preparation of an adhesive composition according to the invention**

- 3.5 grams of PVP K-90, 17.5 grams of PVP K-25, 3.5 grams of Pemulen TR2, and 28 grams of PEG 400 were mixed as a premix. Initially the premix of the plastizicing glycols, the PVP, and the cross-linked polyacrylic acid were added
- 25 and mixed in a Brabender mixer at 120 degrees C for 10 minutes. Then 17.5

grams of the amphiphilic block copolymer (Poly(methyl methacrylate-b-methacrylic acid-b-methyl methacrylate)) were added slowly in order to ensure complete mixing of the components. After approx. 20 min. mixing under reduced pressure a macroscopically homogenous mixture was obtained. The hot adhesive from the mixing chamber is moulded into 1 mm thickness between to sheets of silicone paper.

Example 12

Preparation of an adhesive composition according to the invention

10

3.5 grams of PVP K-90, 17.5 grams of PVP K-25, 3.5 grams of potassium chloride, and 28 grams of de-ionized water were mixed as a premix. Initially the premix of the plastizing water and the PVP were added and mixed in a Brabender mixer at 70 degrees C for 10 minutes. Then 17.5 grams of the amphiphilic block copolymer (Poly(styrene-b-ethylene oxide-b-styrene)) were added slowly in order to ensure complete mixing of the components. After approx. 20 min. mixing to a macroscopically homogenous mixture was obtained. The hot adhesive from the mixing chamber was moulded into 1 mm thickness between to sheets of silicone paper.

15

20

Example 13

The adhesive compositions produced according to Examples were evaluated subjectively with respect to tack, release to finger, hardness, and transparency according to a scale from 0 to 5 having the significance stated in Table 3 below and the colour was also evaluated.

25

Table 3.

| Rating 0 – 5 | | |
|-------------------|------------|--------------|
| Rating | 0 | 5 |
| Tack | No tack | High tack |
| Release to finger | No release | High release |
| Hardness | Soft | Hard |
| Transparency | Unclear | Clear |

The compositions prepared in Examples 1-12 were evaluated by a skilled person according to the rating above and the ratings are stated in the below tables A1-A3.

5 **Table A-1**

| Property | Rating | | |
|---------------------------|--------|--------|--------|
| | Ex. 1 | Ex. 2 | Ex. 3 |
| Tack dry/wet | 5/3 | 5/2 | 4/3 |
| Release to finger dry/wet | 2/2 | 2/2 | 1/1 |
| Hardness | 1 | 1 | 3 |
| Transparency | 2 | 1 | 2 |
| Colour | Yellow | Yellow | Yellow |

Table A-2

| Property | Rating | | | | | |
|---------------------------|--------|--------|--------|--------|--------|--------|
| | Ex. 4 | Ex. 5 | Ex. 6 | Ex. 7 | Ex. 8 | Ex. 9 |
| Tack dry/wet | 5/3 | 5/2 | 4/3 | 5/2 | 5/3 | 3/2 |
| Release to finger dry/wet | 2/2 | 2/2 | 1/1 | 2/2 | 1/2 | 1/1 |
| Hardness | 1 | 1 | 3 | 1 | 1 | 3 |
| Transparency | 2 | 1 | 2 | 2 | 3 | 2 |
| Colour | Yellow | Yellow | Yellow | Yellow | Yellow | Yellow |

10 **Table A-3**

| Property | Rating | | |
|---------------------------|--------|--------|--------|
| | Ex. 10 | Ex. 11 | Ex. 12 |
| Tack dry/wet | 5/3 | 5/2 | 4/5 |
| Release to finger dry/wet | 1 / 2 | 2/2 | 2/2 |
| Hardness | 3 | 1 | 3 |
| Transparency | 2 | 1 | 2 |
| Colour | Yellow | Yellow | Yellow |

Claims

1. A pressure sensitive adhesive composition comprising one or more hydrogel-forming hydrophilic homopolymers or heteropolymers and one or more amphiphilic block-copolymers comprising hydrophobic polymer blocks being incompatible and hydrophilic polymer blocks being compatible with the hydrogel-forming hydrophilic homopolymers or heteropolymers.
5
2. A pressure sensitive adhesive composition as claimed in claim 1 wherein the hydrophilic homopolymer or heteropolymer is a poly-vinylpyrrolidone polymer or copolymer.
10
3. A pressure sensitive adhesive composition as claimed in claim 1 or 2 comprising a plasticizer for the hydrophilic homopolymer or heteropolymer.
15
4. A pressure sensitive adhesive composition as claimed in claim 3 wherein the plasticizer is selected from the group consisting of polyethylene glycols, and water.
- 20 5. An adhesive composition according to any of claims 1-4, characterized in that the amphiphilic polymer contains hydrophobic blocks incompatible with the hydrogel-forming hydrophilic homopolymers or heteropolymers.
- 25 6. An adhesive composition according to any of claims 1-5, characterized in that the amphiphilic polymer contains styrene blocks.
7. An adhesive composition according to any of claims 1-5, characterized in that the amphiphilic polymer contains acrylic hydrophobic blocks
- 30 8. An adhesive composition according to any of claims 1-5, characterized in that the amphiphilic polymer contains blocks from a vinylic unsaturated aliphatic hydrocarbon comprising from 1 to 6 carbon atoms.

9. An adhesive composition according to claim 8, characterized in that the vinylic unsaturated hydrocarbon comprises 4 carbon atoms
10. An adhesive composition according to any of claims 1-4, characterized in
5 that the amphiphilic polymer contains an amphiphilic polyurethane copolymer.

Abstract**An Adhesive Agent and Use of Such Adhesive Agent**

5

10

A pressure sensitive adhesive composition comprising one or more hydrogel-forming hydrophilic homopolymers or heteropolymers and one or more amphiphilic block-copolymers comprising hydrophobic polymer blocks being incompatible and hydrophilic polymer blocks is useful, for example, in transdermal drug delivery systems and other medical, pharmaceutical and cosmetic products that adhere to the skin or other body surface.

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